form of graphic indicia having different areas of light reflectivity, such as a two-dimensional bar code. Printer **38** may take other forms such as a means for printing the two-dimensional pattern of graphic indicia with magnetic-ink. In such a device, magnetic indicia are deposited on the carrier material in a two-dimensional pattern that may be recognized by magnetic-ink recognition sensors.

Turning now to FIG. **3**, the recognition means **14** includes a card reader **40** which contains the converting means **28** and the decoding means **30** of FIG. **1**. The converting means **28** may be a bar code reader such as those disclosed in U.S. patent application Ser. Nos. 317,433 and 317,533, assigned to the same assignee as the present invention and incorporated herein by reference. The readers disclosed in the above patent applications are open system devices designed to read an optically encoded two-dimensional bar code and to convert the light reflected from the pattern into electrical signals representative of the graphic indicia.

The card reader **40** may also comprise a magnetic-ink recognition device for reading and decoding magnetically encoded data. These closed system devices include a magnetic read head that senses the change in reluctance associated with the presence of the magnetic-ink. The use of appropriate converting means that corresponds to the particular data encoding technology employed is contemplated by the present invention.

The decoding means **30** decodes the electrical signals into output signals representative of the data encoded onto carrier means **18**. The decoder output signals are outputted from the recognition unit **40** to various output means **42**. FIG. **3** depicts two examples of output devices, one being a display unit **44** and the other a printer **46**. Display unit **44** may be any suitable display such as liquid crystal display or a CRT. The printer **46** may be any print device such as a dot matrix printer, laser printer, etc.

The system of the present invention maximizes the use of available space for encrypting data. The density of the encoded data is such that for a two-dimensional bar code symbol, a minimum of about **1600** characters can be encoded into a space of approximately $5'' \times \frac{1}{2}''$. In addition to being compact in size, the system provides for high security in the transmission of information. For example, a sensitive message may be encoded onto a document also containing non-sensitive material. This document, the same as any document, can be copied, transmitted by facsimile, etc., but only those with a recognition means of the present invention will be able to "read" the sensitive portion. The carrier means, being a single sheet of paper or a plastic credit card type of card, is an inexpensive read-only-memory structure that facilitates data communication.

In another embodiment, the data may be encoded using a keyed encryption algorithm that may be accessed only by an encryption key. As shown in FIG. **4**, the data entry means **47** contains the keyed algorithm and upon entry of the key **49**, the data will be encoded into a two-dimensional graphic pattern in a unique configuration. The unique configuration can only be read by a reader **48** having the algorithm and only upon entry of the key **49** into the reader. Thus, a high degree of security may be provided with the keyed encryption embodiment.

In addition, the recognition unit **40** may also transmit the output signals to a central processing unit locally or remotely, by for example a modem, for further use or processing by the CPU. In this embodiment, the data encoded onto the carrier means **18** may be control data in the form of machine operating instructions for controlling a robotic system or to a security identification system for performing such functions as unlocking doors. In connection with the use of the present invention in a robotic system, it is contemplated that the two-dimensional graphic pattern containing the control data be placed or printed directly onto a machine part or part holder. A scanner coupled to the machine tool reads the pattern and transmits the decoded instruction to the control computer which in turn controls the machining of the part in accordance with the control program. Another example of the use of the present invention includes a microwave food container where the two-dimensional graphic pattern contains instructions automatically entering the recommended cooking sequence. A further use may be in connection with placing on roadway signs two-dimensional patterns containing geographic location information that may be read by a scanner in passing vehicles for use with onboard computers.

The present invention further contemplates the use of the system of the present invention to encode control data containing machine operating instructions onto the carrier means in the form of machine readable graphic indicia that may be inserted into the machine to effect operation of the machine. FIG. **5** is an example of a facsimile machine **50** in which a document **52** containing human readable data **54** and a two-dimensional pattern of graphic machine readable indicia **56**. The document **52** is inserted into the facsimile machine **50** the same as documents are normally inserted for transmission. The machine **50** contains a converting means for converting the two-dimensional image into electrical signals and a decoding means for decoding the signals into output signals operative to actuate the facsimile machine **50**. The pattern **56** may contain such information as the phone number of the intended recipient of the memo **54** and the appropriate instructions for automatically entering the phone number and actuating the transmission process. Thus, where numerous messages are faxed to a particular recipient, a supply of paper containing the phone number of the recipient encoded in the two-dimensional graphic indicia machine readable format may be maintained by the sender. The transmission of messages to that recipient will be facilitated by placing the message onto the pre-encoded paper and simply inserting the paper into the facsimile machine. In addition to simplifying and speeding the transmission process, the possibility of sending highly sensitive information to an incorrect party will also be eliminated.

FIG. **6** is a representation of an embodiment of a two dimensional bar code as the term is used in this patent specification. Such a bar code, taken from Allais, U.S. Pat. No. 4,794,239, includes a plurality of ordered rows of codewords of bar code information, one row adjacent to and beneath another row, each codeword representing at least one information bearing character.

While the invention has been particularly shown and described with respect to preferred embodiments thereof, it will be understood by those skilled in the art that the foregoing and other changes in form and detail may be made therein without departing from the spirit and scope of the invention which should be limited only by the scope of the appended claims.

What is claimed is: